

RECEIVED  
CENTRAL FAX CENTER

AUG 29 2006

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all previous listings and versions of claim in this application:

1. (Cancelled)
2. (Currently Amended) The method according to claim 29-1 wherein the wet chemical etching includes an aqueous hydrofluoric acid solution (HF) as an etchant.
3. (Currently Amended) The method according to claim 29-1 wherein the wet chemical etching includes an etchant that includes hydrofluoric acid (HF), ammonium fluoride (NH<sub>4</sub>F) and water.
4. (Currently Amended) The method according to claim 29-1 wherein the duration of wet chemical etching is in the range of about 5 seconds to about 30 minutes.
5. (Currently Amended) The method according to claim 29-1 wherein the temperature of wet chemical etching is in the range of between about room temperature to about 80°C.

Claims 6-10. (Cancelled)

11. (Currently Amended) The method according to claim 29-1 wherein the substrate is a silicon wafer.
12. (Currently Amended) The method according to claim 29-1 wherein the substrate is a metal.

-2-

Response to Office Action dated April 12, 2006  
Application Serial No. 10/664,781  
Atty Docket No. 4717-6100

NY:1052807.1

13. (Previously Presented) The method according to claim 11 which further comprises bonding the etched surface of one substrate to an etched surface of another substrate, by laying one wafer on the other and applying pressure to one of the substrates to form a bonded pair of substrates.

14. (Previously Presented) The method according to claim 13 which further comprises annealing the bonded substrates to increase bonding strength to between 0.28 and 0.38 MPa when measured at room temperature.

15. (Previously Presented) The method according to claim 14, wherein the annealing temperature is about 500°C.

16. (Cancelled).

17. (Currently Amended) The method according to claim ~~32~~-16 wherein the wet chemical etching comprises a solution of the hydrofluoric acid with ammonium fluoride and water.

18. (Previously Presented) The method according to claim 17 wherein the duration of wet chemical etching is in the range of about 5 seconds to about 30 minutes.

19. (Previously Presented) The method according to claim 18 wherein the temperature of wet chemical etching is in the range of between about room temperature to about 80°C.

20. (Currently Amended) The method according to claim ~~32~~-16 which further comprises treating the surface of the other substrate by the same wet chemical etching process prior to bonding the etched surfaces together.

-3-

Response to Office Action dated April 12, 2006  
Application Serial No. 10/664,781  
Atty Docket No. 4717-6100

NY:1052807.1

21. (Currently Amended) The method according to claim ~~32-46~~ which further comprises annealing the bonded substrates to increase bonding strength.

22. (Previously Presented) The method according to claim 21 wherein the annealing temperature is about 500°C.

23. (Currently Amended) The method according to claim ~~32-46~~ wherein the substrate is a silicon wafer.

24. (Currently Amended) The method according to claim ~~32-46~~ wherein the substrate is a metal.

25. (Cancelled)

26. (Currently Amended) The method of claim ~~29 2~~, further comprising ~~providing the closed container, which container contains the hydrofluoric acid solution bath and the gaseous ozone atmosphere, wherein the exposing the substrate is exposed to the gaseous ozone atmosphere to uniformly saturate the substrate surface with oxygen.~~

27. (Currently Amended) The method of claim 26, wherein the substrate is silicon and is exposed to the gaseous ~~ozone~~ atmosphere to uniformly saturate the substrate surface with silanol sites, the method further comprising bonding the substrate surface to another surface of the other substrate, which other surface is uniformly saturated with silanol sites.

28. (Previously Presented) The method of producing an enhanced bonding of substrates, providing first and second substrates with dry hydrophilic surfaces to enhance subsequent bonding to the each other by the method of claim ~~29 2~~, further comprising bonding the dry hydrophilic surfaces of the first and second substrates to each other, which surfaces enhance the bonding therebetween.

-4-

Response to Office Action dated April 12, 2006  
Application Serial No. 10/664,781  
Atty Docket No. 4717-6100

NY:1052807.1

29. (New) A method for producing a bondable surface on a substrate for subsequent bonding to another substrate comprising:

- providing a closed container having a gaseous atmosphere;
- providing a bath containing an etchant;
- providing a substrate surface having an oxide layer;
- positioning the bath within the closed container;
- treating the substrate surface by a wet chemical etching process in the bath;
- saturating at least a portion of the substrate with hydrogen; and
- removing the substrate from the bath, thereby exposing the substrate to the gaseous atmosphere to form a dry hydrophilic surface having silanol sites for bonding to the other substrate.

30. (New) The method of claim 29 wherein the treating step comprises immersing the substrate into the etchant in the bath to remove the oxide layer and provide an etched hydrophobic surface.

31. (New) The method of claim 30 wherein exposing the substrate to a gaseous atmosphere results in a dry hydrophilic surface.

32. (New) A method for bonding substrates comprising:

- placing a first substrate having an oxide layer in a bath, wherein the bath is positioned within a closed container having a gaseous ozone atmosphere;
- immersing the first substrate in the bath containing an etchant, thereby removing the oxide layer and providing an etched hydrophobic surface;
- saturating the surface with hydrogen;
- removing the etched hydrophobic surface from the bath to expose the surface to the gaseous ozone atmosphere, thereby forming a dry hydrophilic surface on the first substrate; and
- bonding the dry hydrophilic surface of the first substrate to a surface of a second substrate.

-5-

Response to Office Action dated April 12, 2006  
Application Serial No. 10/664,781  
Atty Docket No. 4717-6100

NY:1052807.1

33. (New) The method of claim 32 wherein bonding comprises:  
engaging the hydrophilic surface of the first substrate to the surface of the second substrate;

applying pressure to at least one of the first and second substrates such that the hydrophilic surface of the first substrate enhances the bonding of the substrates.

34. (New) A method for forming a bonding surface on a substrate having an oxide layer comprising:

placing a first substrate in a bath, wherein the bath is positioned within a closed container having a gaseous ozone atmosphere;

immersing the first substrate in the bath containing an etchant, thereby removing the oxide layer and providing an etched hydrophobic surface;

removing the etched hydrophobic surface from the bath to expose the surface to the gaseous ozone atmosphere, thereby forming a dry hydrophilic surface on the first substrate having a plurality of silanol sites; and

bonding the dry hydrophilic surface of the first substrate to a surface of a second substrate.

35. (New) The method of claim 34 further comprising forming siloxane sites when bonding the hydrophilic surface of the first substrate to the surface of the second substrate.